

# Antiviral, Antidiabetic, and other Health Effects Of Dragon Fruit and Potential Delivery Systems for its Bioactive Compounds

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**Abstract:** *Dragon fruit (Hylocereus spp.), a tropical fruit of growing nutritional and pharmaceutical interest, is a rich source of bioactive compounds such as betacyanins, betaxanthins, polyphenols, flavonoids, and polysaccharides. These constituents exhibit multiple pharmacological activities, including notable antiviral and antidiabetic effects. Betacyanins have demonstrated inhibitory actions against viral replication by modulating host immune responses and suppressing viral protein expression, while polysaccharides and phenolic compounds contribute to improved glucose metabolism, enhanced insulin sensitivity, and protection against oxidative stress. Beyond these, dragon fruit bioactives display anti-inflammatory, antioxidant, antimicrobial, hepatoprotective, and cardioprotective properties, underscoring their broad therapeutic potential. However, their clinical effectiveness is limited by poor stability, bioavailability, and degradation under physiological and processing conditions. To overcome these challenges, advanced delivery systems such as nanoliposomes, nanoemulsions, biopolymer-based nanoparticles, and encapsulation techniques have been developed to enhance the stability, controlled release, and absorption of these compounds. This review highlights the recent advances in understanding the antiviral and antidiabetic mechanisms of dragon fruit bioactives and explores innovative delivery strategies that can potentiate their health-promoting efficacy in functional foods and nutraceutical formulations..*

**Keywords:** Dragon fruit, Antiviral, Antidiabetic, bioactive compounds, Hylocereus polyrrizhus, Betalains, Betacyanin, Delivery systems, Hylocereus species, pitaya

